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Cultural immersion aimed at improving professional integration in the Moroccan offshore industry

Philippe Saliou, Vincent Ribaud
Université de Brest, UEB
LabSTICC
Brest, France
{psaliou, ribaud}@univ-brest.fr

Abstract— A young offshore software industry has grown up in Morocco. A network of 9 universities has set up two schemes promoting mobility towards France, strongly governed by the principle of driving skills gained back to Moroccan economic development. Academic objectives are related to software development and offshoring. A proportion of its success results from extra-academic factors: student selection, student support, internship supervision dedicated to a pre-employment in Moroccan companies. In all of these aspects, the University of Brest is acting as a hub between the various stakeholders, and its role could be compared to a placement agency, perhaps beyond the scope of its usual missions.

Keywords—component; global software development, offshore, professional integration.

I. INTRODUCTION

The growth of Global Software Development impacted the informatics education system and universities are now offering specialized courses or whole programmes dedicated to Global Software Development / Global Software Engineering (GSD/GSE) [1, 2, 3, 4]. [5] performed a systematic literature review of GSD training and education. One of the findings is that all the software processes (from the GSD point of view) reviewed in the study are particularly affected by communication problems and cultural and language differences. Obviously, most courses and programmes are agreed on the fact that the training and teaching in this area have become an important topic.

Researchers have long since established that software development, particularly in the early stages, requires a great deal of communication [6]. In the case of GSD, communication issues are often related to cultural and linguistic aspects. Hofstede's cultural framework [7] is the most cited used framework in IT-related research. E. T. Hall's work [8,9] is also used in [10,11]. Hall [12] distinguishes three key factors of cultural difference: space, context and time (presented respectively in [9,8,13]) that form the background of the work presented here. Hall treats culture as a form of communication, with three basic behaviour modes or levels: formal, informal, and technical [12]. He shows how this 3-level framework applies to different domains: learning, awareness, affect and attitudes toward change. Since our main focus is learning, we offer an illustration of this. Formal learning is a set of rules and patterns taught by precept and admonition through a trial-and-error method. Informal learning, according to Hall, can seldom

be described in any detailed fashion. Informal learning depends upon models being copied. Technical learning is usually transmitted in explicit terms from the teacher to the student. *"Unlike informal learning, it depends less on the aptitude of the student and the selection of adequate models, but more on the intelligence with which the material is analysed and presented [10]"*. Regarding the goal of professional integration, our hypothesis is that most technical learning is driven and implemented by organisations involved in GSD, and beyond the scope of our learning objectives in certain respects. Formal and informal learning obviously happens in preparing young IT engineers in an academic programme. However, when students are immersed in another culture, formal and informal learning of culture is achieved outside of the academic learning process.

The young Moroccan offshore industry has rapidly grown up as an attempt by French software companies to meet their client's demands for offshoring software projects. The Moroccan government has completed several initiatives aimed at fostering offshore industry. Regarding IT education, government funding helped start new programmes called "Masters Offshoring" at almost every Moroccan university. At the same time, a French-Moroccan intergovernmental programme was set up to help Moroccan universities development across three aspects: research, teaching and governance. For informatics teaching, a network of 7 Moroccan and 3 French universities was set up in 2007. Our university's contribution offers some Moroccan students the possibility of performing their final internship (6 months) in few major software companies which have joint software projects between France and Morocco. Recently, we added to this mobility scheme the possibility of basing the final year of study in France, leading to the award of a double Masters degree - Moroccan and French. The whole programme is called Information Technologies Offshoring (*Offshoring des Technologies de l'Information - OTI*). We started a longitudinal study of the young graduates' employability.

The context of this on-going study is the professional integration of young engineers in the Moroccan offshore software industry. Cultural factors, distance, communication and institutional issues are drafted in section II, along with related GSD Masters programmes. Section III lays out different aspects of the programme, using the Mediterranean Office for Youth criteria as an outline. Some distribution statistics and employment rates are presented in section IV with an attempt to reposition certain elements of the programme towards Hall's cultural factors and modes. We finish with a short conclusion.

II. ISSUES ANALYSIS

A. Hall's cultural factors

Hall and Trager develop a theory of culture grounded on a theoretical basis issuing from the communications domain [10]. Among the various cultural factors, Hall has emphasised space (in "The hidden dimension" [9]), context (in "Beyond culture" [8]), and time (in "The dance of life" [17]). In the rest of this section, we sketch out certain features of each factor, illustrating it with differences observed between French and Moroccan Masters students. Although generalization has its own limits, French Masters students are representative of Western novice engineers, whereas Moroccan Masters students are representative of Arab novice engineers. Hence, Hall's examples on Western and Arabic cultures are fairly significant.

1) *Space*: Hall defines proxemics as "*the interrelated observations and theories of man's use of space as a specialized elaboration of culture*" [9] emphasising the impact of proxemic behaviour (the use of space) on interpersonal communication. Some people need more space in all areas of life. Some people are more territorial than others and more concerned with ownership. There is a difference between French people from the South and those from the North. Northern French people – like Northern Europeans – experience their space as an extension of themselves. For instance, a different meaning is accorded to leaving an office door open, or closed. Southern French people, like Mediterranean people (including most Moroccan people) like to be closed together and to touch each other, especially between friends. Use of space differs and they remain silent in order to be alone with their thoughts. Moroccan students behaviour is mostly gregarious; they form groups French people might consider invasive and noisy. French students tend to live alone or in small groups, and appear individualistic to Moroccans.

2) *Context*: "A high-context communication or message is one in which most of the communication is already in the person while very little is in the coded, explicit, transmitted part of the message. A low-context communication is just the opposite; i.e. the mass of the information is vested in the explicit code [8]." Arabs and Mediterranean peoples (including French people) are high-context and neither require nor expect much in-depth information in everyday life. Low context-people include Americans and Northern Europeans, and they demand detailed background information each time they interact with others. It is easier to integrate in a low-context culture because most of the background is explained. A high-context culture can be very confusing for those who do are neither familiar with, nor understand, that culture's hidden rules. Because both cultures are high-context, French people encounter difficulties in understanding Moroccan culture - as do Moroccans with French culture. A good example is the misunderstanding and controversy (known as the "headscarf ban") which has arisen as a result of the determination of three Muslim high-school students on wearing the hijab (a veil which covers the hair and neck) in a French state school. We sometimes encounter similar situations with some young Moroccan women - both at the university and at the office.

3) *Time*: "There are many kinds of time systems in the world, but two are most important to international business. [...] Monochronic time means paying attention to and doing only one thing at a time. Polychronic time means being involved with many things at once. Like oil and water, the two systems do not mix [13]." Western cultures - especially that shared by North American business and North European peoples "are dominated by the iron hand of monochronic time [14]". Mediterranean peoples are polychronic and time-flexible. French people are polychronic but tend to adopt a monochronic rigor at the university or the office. Moroccan students (and Moroccan teachers) are often late and have difficulties complying with fixed schedules and deadlines. Moroccan students might not be used to listening to professors without interrupting them and participating in the lecture. Conversely, the Western professional world (including French teachers) tends to think of time as something fixed in nature and are driven to distraction by Moroccan students' elastic sense of time, and their willingness to have several operations underway at the same time (although this sort of multitasking is becoming increasingly commonplace young people in the Western world).

B. Distance and communication issues in GSD

GSD research addresses distance (in time, space or culture) as a main issue [15]. GSD teams are composed of teammates with different countries, different languages and different cultures. Several studies relate the importance of the meeting of involved actors and the confrontation of cultures, called the cultural liaison in [16] and the feeling of 'teamness' among distributed project members in [17]. A strong demand from our industrial partners was to help French and Moroccan teammates "rub up against one another".

Communication difficulties are cited by numerous authors, for instance: "*the key challenge of global software engineering is to establish appropriate communication and coordination habits in a global project environment* [18]". Most recommendations are based on solutions that are themselves based on technical communication systems or shared knowledge management practices. [19] asked: "*did we really think that software engineering techniques could resolve all GSE problems? Maybe that is what we expected – but that is not what we found*". Several authors state that software projects have two complementary communication channels, the first for formal, official communication, and the second for informal, spontaneous conversation, [20] argue that "*that most of the existing co-ordination support tools have used formal communication procedures, and that there is a need for nurturing informal communication procedures as well.*"

C. Institutional issues

Morocco recently reformed its higher education system and a governmental cooperation was set up in 2004 to highlight Moroccan universities with French good practices. In the domain of informatics education, Moroccan and French stakeholders agreed to our university's proposal to act as a kind of placement agency providing some students with an internship in France. Ensuring graduates will return to the country of origin (Morocco) was seen as a crucial issue, and

one that can only be guaranteed by strong institutional governance of this student's mobility.

The Mediterranean Office for Youth - MOY (<http://www.officemediterraneendela jeunesse.org/en>) was recently established in recognition of the fact that circular migration for educational purposes is a decisive factor in the development of wealth, intercultural exchange, and mutual understanding in the Mediterranean region. The MOY label is awarded to Masters and PhD programmes meeting the conditions and criteria set by MOY for the purposes of facilitating student mobility in disciplines identified as priorities for the development of the Mediterranean region, and promoting the employment of young people in their country of origin. We responded to the first call for proposals for MOY labelling, and our programme was selected, along with 41 others, and is the only joint Masters in information technologies or software engineering.

D. GSD academic programmes

Few universities offer entire programmes intended to prepare IT engineers to work in a multicultural environment. Detroit Mercy University has offered such a course for more than 20 years now: *International Studies in Software Engineering Program* (ISSE). The programme has two objectives [3]: “to help students understand that there are models of practice that may not originate from or be a part of their culture [...] to equip them to work within the rules and practices of the target culture.” The main course of action is to immerse students in foreign culture - which is also our principal method. Our programme differs in that we offer Moroccan students an experience in a foreign university and in a foreign business (the French side of the company linked with the potential Moroccan employer).

In Europe, we are aware of two European Masters programmes in Global Software Engineering, which they have named: *European Master on Software Engineering* (EMSE, <http://emse.fi.upm.es/>) and *Global Software Engineering European Master* (GSEEM, <http://www.gseem.eu/>). Both of these use a 1-year mobility scheme, with the first year completed at the university of origin and the second at a foreign university. Like our proposal, this is a one-year foreign immersion leading to a double Masters degree. Both programmes are research-oriented; they do not address the specificities of GSD professional integration.

III. ELEMENTS OF THE INFORMATION TECHNOLOGIES OFFSHORING PROGRAMME

A. Background

Professional integration issues have been at the heart of the programme ever since it was started, back in 2007. Strict control of mobility is required. The French government priority is to prevent illegal immigration, and Morocco wants to keep its hang onto its most talented people. Industrials aim to develop both parts of global teams: the French side (known as the ‘front office’) which is managing the client relationship and the Moroccan side (known as the ‘back office’) which is performing some software development activities.

Foreign student exchange is a proven and well-controlled process using intergovernmental initiatives such as Erasmus. Gaining a qualification in France through a work period (even an internship) entails being subject to labour laws and regulation. This is far more complex than simple student mobility. The programme's leitmotiv is therefore to acquire an initial professional experience in France, in order to mobilize skills and competencies gained, to the benefit of Moroccan economical development. Moroccan universities and their students relate to both the French and Moroccan sides of global software companies through the University of Brest acting as a regulation hub. In many cases, our university finds itself dealing with administrative, legal, and logistics issues that fairly remote from academic concerns.

The remainder of this section will use MOY criteria to present some elements of the programme.

B. Internationalisation and quality of the programme

MOY asks applicants to describe the international aspects of the programme, touching on its design, implementation, and the origin of students. MOY asks how the programme will contribute to the excellence, innovativeness, and competitiveness of the Mediterranean region.

The programme was built on a step-by-step basis between our university and 8 Moroccan universities in order to foster the professional integration of graduates, and to fulfil a demand from industrial partners. 14 students were involved in 2008, and 33 in 2012 (142 over the whole 2008-2012 period). Because the economic situation was changing each year and French laws related to immigration were being enforced, design and implementation evolved continuously. For instance, we suspended the 6-months mobility scheme in 2011-2012 to make changes required to comply with new labour laws.

C. Quality of the partnership and mobility scheme

MOY applicants are asked to describe how the proposed partnership offers added value, ensures educational excellence. They are also required to justify its relevance and the organisational details of the mobility requirements applicable to students in the programme.

Depending on the mobility scheme (6-months or 1-year in France), Moroccan students complete the first three semesters, or the first year, in any of four different Masters in Informatics:

- Software development and quality: UH2M (Casablanca), UIT (Kenitra) and UCD (El Jadida) universities
- Networking and systems: UIZ (Agadir), UH2M (Casablanca), UH1 (Settat) and UAE (Tangiers) universities
- Information systems: UCAM (Marrakech) university
- Applied Informatics Offshoring: UM5A (Rabat) university

The 1-year mobility scheme leads to a double Masters degree, one delivered by the Moroccan university of origin and the other by our university. Since no formal assessment was used as proof of programme excellence, only employment statistics presented in section IV.D indicate programme adequacy. Mobility after each semester was considered but rejected, because it would have incurred high overheads in administrative formalities, as well as travelling and

accommodation expenses. The 1+1 year mobility scheme is used in all the international Masters programmes we are aware of.

D. Career placement mechanisms to respond to the needs of the local labour market

MOY applicants are asked to describe how the proposed programme responds to the skill needs of the Mediterranean region, and how it makes graduates more employable.

Both mobility schemes use internship as a placement mechanism. The French name of the internship is “*Stage en France avec une pré-embauche au Maroc*” which means “Internship in France with pre-employment in Morocco”. The name carries shared meaning and approval. The recruitment of Masters graduates is the goal for all stakeholders. Each business unit of each global software company has a different offshore model related to business organization, customer needs and company know-how. Matching industrial requirements with both student expectations and academic rules is a complicated task. The University of Brest has to centralize internship offers and regulate intern assignments. Internships must be located somewhere in France, within a business unit that is working with an offshore component in Morocco. Our university is acting as a kind of placement agency, and is also a subcontractor to each Moroccan university for intern supervision and assessment.

E. Provision for supporting mobile students

MOY applicants are asked to furnish a description of measures aimed at providing mobile students with information and support both before and after their arrival.

The Moroccan universities are responsible for marketing the programme. For the 6-month mobility scheme, intern selection is performed by Moroccan companies, because of the pre-hiring objective. Next, a suitable internship and French site assignment has to be allocated to each intern, along with dedicated support for resolving administrative issues and logistics help from our university. For the 1-year mobility scheme, we are limiting student numbers to around 30, and each Moroccan university has to select a maximum of 10 students who will then apply through our selection process. The MOY label provides us with 4 excellence grants and thanks to our main industrial sponsor, we are able to provide 12 grants, assigned on financial criteria. Grants allow good students to go ahead and apply, regardless of economic limitations. Because almost all students may be reluctant to leave their country, financial support is not enough in itself. A strong support system has been set up, including a close partnership with the CROUS (a governmental agency in charge of improving student lives in many ways, including food services, housing, social and cultural activities). The local CROUS provides the programme with a sufficient number of rooms in campus residences, resolving one of the main logistics issues. Academic staff has to deal with these issues, regardless of whether or not it falls within academic scope.

IV. ASSESSMENT

This section presents some assessment elements regarding Hall’s framework as mentioned in sections II and III.

A. Statistical data about internships

1) *Cohort count*: Table I presents the cumulated count for the last 5 years (grouped by university) of students having performed (or planning to perform) an internship in France under our supervision.

TABLE I. INTERNSHIPS GROUP BY UNIVERSITIES FROM 2008 TO 2012

Univ	UIZ	UH2M	UCD	UIT	UCAM	UM5A	UH1	UAE
Nb.	23	27	3	30	13	28	9	9

2) *Geographical dispersion*: Table II presents the cumulated count for the last 5 years (grouped by French location) of students having performed an internship under our supervision.

TABLE II. INTERNSHIPS GROUP BY LOCATION FROM 2008 TO 2012

City	Aix-Provence	Amiens	Bordeaux	Brest	Lille	Lyon	Montpellier	Nantes	Paris	Rennes	Strasbourg	Toulouse
Nb.	2	3	32	16	3	13	3	34	25	4	2	5

B. Formal culture

According to E. T. Hall, the formal culture in a society is what is experienced in day-to-day life, mastered by anybody belonging to this culture. Formal culture is implicitly accepted by audiences. Formal activities are largely learned as we grow up, through a trial-and-error method. Hall’s thesis is that the “*formal is seldom recognized as such*” [10]. Since the formal is seldom recognized as such, what comes across to foreigners visiting a foreign country as incomprehensible, says Hall, is in fact another “formal” system of communication which is accepted implicitly as “natural” within the other cultural system. Formal learning is a severe process which leads people towards “culturally correct” behaviour. Once the programme was underway, we realised it was necessary to add certain formal measures, intended to introduce Moroccan students to some formal aspects of French culture.

1) *Time*: In western universities and offices, working hours start early and last 8 whole hours of monochronic time - concentrating on the job and avoiding distractions and interruptions. Despite strongly-stated information, frequent warnings and admonitions, the rate of Moroccan students arriving late or missing work days was continually increasing as the year went along. This year, we introduced a coercive measure - unusual at Masters level – aimed at addressing this problem: the final mark in each course has a 10% modulation based on assiduity; a bonus where attendance was good, and a penalty where more than one non-excused absence was stated. At the time of writing (2 months’ in), lateness and absenteeism are much diminished.

2) *Space*: The whole group of Moroccan students is accommodated in the same hall of residence – as requested by

them, and which suits their gregarious habits. Last year, they formed noisy groups, causing other students to complain of disturbance. A small controversy arose between Moroccan students and administrative staff, which led to the (temporary) exclusion of a ringleading student from the residence – only then was the message understood.

3) *Context*: Right from the outset, stakeholders are made aware of and (at least in theory) agree to the obligation of returning to Morocco following graduation. Students sign a personal undertaking to return home, and to accept a job offer if one is forthcoming from the internship company. However, each year a few students attempt to betray their commitment by escaping into the French labour market. Therefore, the signed undertaking now includes the option for companies of asking interns to refund part of the salary they have been paid, if they go on to refuse a job offer in Morocco.

Clearly, French teachers and software project managers should learn the formal specificities of time, space and context in Moroccan culture. Frequent stays (of sufficient length) in Morocco, together with goodwill and an open-minded approach, may help us learn about formal Moroccan culture.

C. Informal culture

In Hall's theory, the informal is made up of activities and habits that were once learned, but which have become automatic. According to Hall, informal refers to events, that are unorganized or involving little-known or unknown situations. Immersion is the main process through which informal culture is learned.

1) *Time*: To a certain extent, the good teachers and project managers from France are informally learning the polychronic time of Moroccan people. Moroccan students and novices generally answer "yes" to any request, even when they do not - consciously or unconsciously - have the slightest intention of fulfilling the request. Even when they are working on responding to the request, any event is capable of undermining the process underway, and disrupting the schedule. Hence, French managers have to introduce some (secret) delaying tactics to the monochronic schedule, and they have to offer firm but polite reminders of milestones. Problems may arise when a Moroccan student or novice makes a mistake. Whereas a French person will accept admonishment and then carry on, Moroccans do not like to lose face - and the situation may become blocked. Conversely, French people should learn from Moroccans that work is not the be-all and end-all, and accept sharing small moments of conviviality within the work schedule and at the workplace.

2) *Space*: Class set-up and software projects open-space are shared environments well-suited to Mediterranean people, who do like to be informed about, and participate in, several activities at once, in a single space. Territorial types might only be satisfied when they get their own office, and might also be unable to concentrate on their job in a shared space. The use of space in modern software factories is learned formally - employees do not have any other choice - and informally - some of them are able to rebuild the space they need in certain situations.

3) *Context*: Informal learning of context relies on new situations in which experience is gained from others. In

addition to scientific and technical aspects, the programme offers numerous actions aimed at preparing for employability: a course intended to prepare for professional integration, lectures by industrial workers, workshops simulating job interviews, coaching sessions for job applicants. These activities allow students to better understand the codes of conduct and communication in France. Another example is about religion. Almost all Moroccan students are of the Islamic faith, following rules that might be unknown and misunderstood in France. Conversely, secularism (precisely, the absence of distinctive religious signs) at school or at work is an important rule of social life in France and might be difficult for Moroccans to understand. A year of immersion in French culture might give Moroccan students an opportunity to discover French culture. On the other hand, Moroccan interns bring a taste of Moroccan culture when they are assigned to French teams, as they follow rules such as no smoking, and no alcohol, or as they fast during Ramadan.

Problems can arise when the informal becomes formal without anyone noticing. Last year, an intern was performing her internship at the final client site (not in the software company office), and the client told the young woman (and her company) that she must remove her headscarf at work. There were neither previous examples of the wearing of headscarves at the client's site, nor examples for the young woman of other colleagues having had to remove their headscarves. Both sides refused any compromise, and the software company had to find another suitable internship for the young woman. Teachers worked hard to find a solution, with the help of senior Moroccan women - but it was too late.

A good way of nurturing informal culture is to favour (as mentioned in section II.B) an informal communication channel for the use of software teams. "*Informal "corridor talk" helps people stay aware of what is going on around them, [...], what states various parts of the project are in, [...], and many other essential pieces of background information that enable developers to work together efficiently* [15]". This may be missing in a distributed team, with very little informal, spontaneous communication between distant sites. "*Absence of ongoing conversation can also lead to surprises from distant sites, potentially resulting in misalignment and rework* [15]". Immersion of future Moroccan employees within the French part of the team allowed them to become aware that this informal channel was useful on the French site, and needs to be rebuilt (through instant messaging, short messages ...) between distant sites.

D. Career placement results

An indication of Moroccan software companies' satisfaction might be the percentage of interns that have been employed after the internship period. Table IV presents the percentage of interns kept on at their companies following the internship. The overall percentage is 100 interns employed over 142 internships, i.e. a hiring rate of 70%.

Statistics can only be viewed in the light of the economic situation. In 2008, 100% of the 14 interns were employed by the internship company. In 2009, one third of 27 students refused the company proposal, looking for a better offer. In 2010, 19 interns out of 20 were employed. In 2011 and 2012,

as the market tensed, three graduates out of five had a firm job offer following the internship.

TABLE III. EMPLOYMENT COUNT AFTER INTERNSHIPS FROM 2008 TO 2012

Year	2008		2009		2010		2011		2012	
	Int.	Hire	Int.	Hire	Int.	Hire	Int.	Hire	Int.	Hire
Interns	15	15	27	18	20	18	47	30	33	19

CONCLUSION

This paper presents a mobility programme set up between 8 Moroccan universities and the University of Brest. For several reasons, including economic growth and governmental policy, the leitmotiv of the programme is to acquire an initial professional experience in France for the benefit of Moroccan economical development. The main stakeholders are Moroccan universities and their students, and the French and Moroccan sides of global software companies. Complete transparency is required and the University of Brest acts as a hub connecting all stakeholders. Its role could be compared to that of a placement agency – which is somewhat beyond the scope of its usual missions. In this respect, it differs fundamentally from other international joint programmes.

Support for mobile students and intern placements favours the arrival of good students and the encounter of two different cultures at the workplace. As Hall mentioned, "*formal is seldom recognized as such*" [10] and this encounter helps both sides discover that the other "incomprehensible" culture is in fact another "formal" system of communication.

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